PTN Electronics

MTX Series Matrix Switcher

User Manual

Please read this manual carefully before using this product.

Notice：

This **MTX series Matrix Switchers User Manual** takes example of the Matrix model MTX400. It can be used as user's manual of other MTX series matrix switcher models.

This manual is only an instruction for operators, not for any maintenance usage. The functions described in this version are updated till Jan 2010. Any changes of functions and parameters since then will be informed separately. Please refer to the dealers for the latest details.

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All product function is valid till 2010-1-1

⚠ Safety Operation Guide

In order to ensure the credibility use of the product and the user's safety, please comply with the following items during installation and maintenance:

①

The system must be earthed properly. Please do not use two blades plugs and ensure the alternating power supply ranged from 100v to 240v and from 50Hz to 60Hz.

②

Do not put the switcher in a place of too hot or too cold.

③

To avoid any damage by over heat, please keep the working environment good in ventilation to radiate the heat when running the switcher.

④

The switchers should be turned off when in rainy and humid days or nonuse for a long time,

⑤

The alternating power supply line should be disconnected with the power socket during the following operation.

A. Take out or reinstall any component of the switcher
B. Disconnect or re-connect any connector of the switcher

⑥

Please do not attempt to maintain and uncover the switcher for there is a high-voltage component inside and the risk of the electric shock.

⑦

Do not splash any chemical product or liquid on or near the equipment.

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1. Introduction

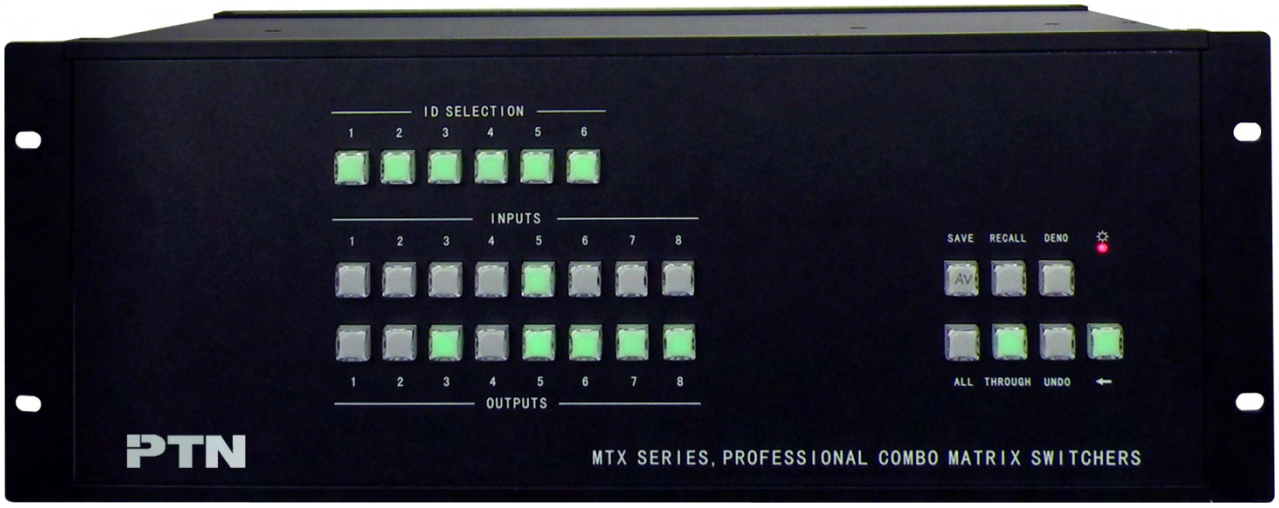
1.1 About MTX Matrix Switcher System

MTX series Matrix switcher is a flexible solution for the combo signal management. It is working with the MX series changeable cards, including various signals, such as VGA, DVG, HDMI, composite video, s-video, USB2.0, audio mixer, twisted pair etc. It combines all the functions of different cards, to be a comprehensive audiovisual solution.

Various changeable cards make the MTX series become flexible, and all-in-one solution for different project. The user can choose the right card, the right function for different application. It includes almost all the regular audiovisual signals, and control signal. And, PTN electronics limited will launch more and more new cards, which will work compatible with the MTX series.

Every card works independently, controlled by the main board in the front panel. The cards are controlled by the RS232, front panel buttons, and TCP/IP (optional function).
Every card is going with the ID identification. So, it works with the main board by internal protocol.

The MTX series product is used for different project, because of the change-able card design. It is the combo solution for multimedia classroom, control rooms, conference rooms, lecture rooms, shopping center etc. It will handle all the audiovisual management, including the switching, driving, scaling etc.



F 1-1 MTX400

1.2 MTX Series Matrix Switcher Models

1.2.1 the MTX series chassis (main unit) .

Itcan be classified into the following models:

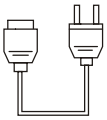
Specifications / Models	Height	Maximum Slot	Power supplies	RS232 control	Network control
MTX200	2U	3	Signal	√	Optional
MTX400	4U	6	Redundant	√	Optional
MTX500	5U	8	Redundant	√	Optional

1.2.2 MTX card (changeable cards)

According to different situation and users, the MTX card (changeable cards) can be classified into the following models:

Specifications / Models	Inputs	Outputs	Signal Format	Height	Features
MXDV4	4	4	DVI (HDMI)	Signal Gang	Router
MXDV8	8	8	DVI (HDMI)	Double Gang	Router
MXHD4	4	4	HDMI (DVI)	Signal Gang	Router
MXVG4	4	4	VGA	Signal Gang	Router
MXVG8	8	8	VGA	Double Gang	Router
MXCV8	8	8	C Video	DVI (HDMI)	Router
MXSV8	8	8	S Video	DVI (HDMI)	Router
MXAU8	8	8	Stereo Audio	DVI (HDMI)	Router
MXUS8	8	8	USB2.0	DVI (HDMI)	Router
MXPA8	8	8	Stereo Audio	DVI (HDMI)	Processor
MXTP8	8	8	VGA Twisted Pair	Double Gang	Driver
All modules above are for separated case design,					

2. Packing of the Product

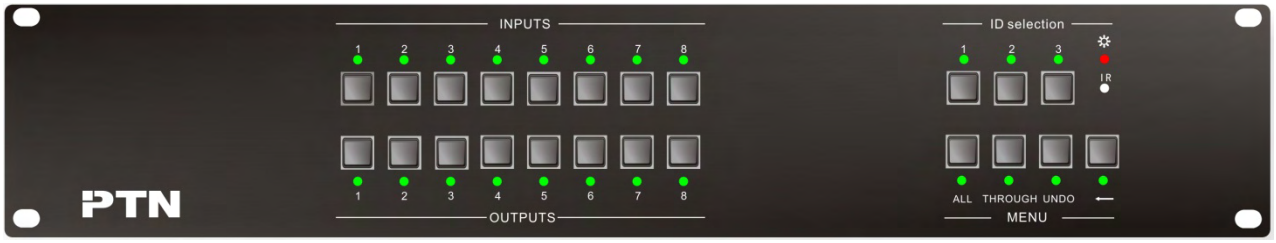
Pictures	Description
	MTX matrix switcher (with empty slot and empty cover)
	RS-232 Communication Cord
	Power Supply Cord
	CD with Application **SWITCHER 2.0**
	User manual
	Rubber cushion

3. Installation

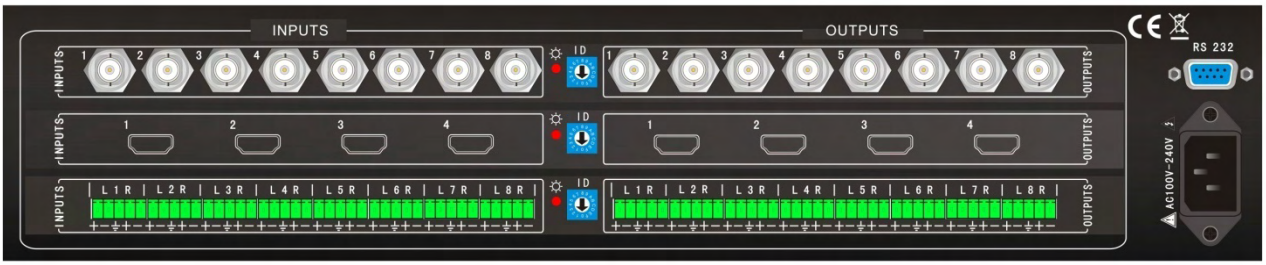
MTX series matrix switchers adopt metal shell and can be stacked with other device. Moreover, they are rack-mountable enclosure and can be installed in the standard 19 inches case.

4. Front View and Rear View of the Product

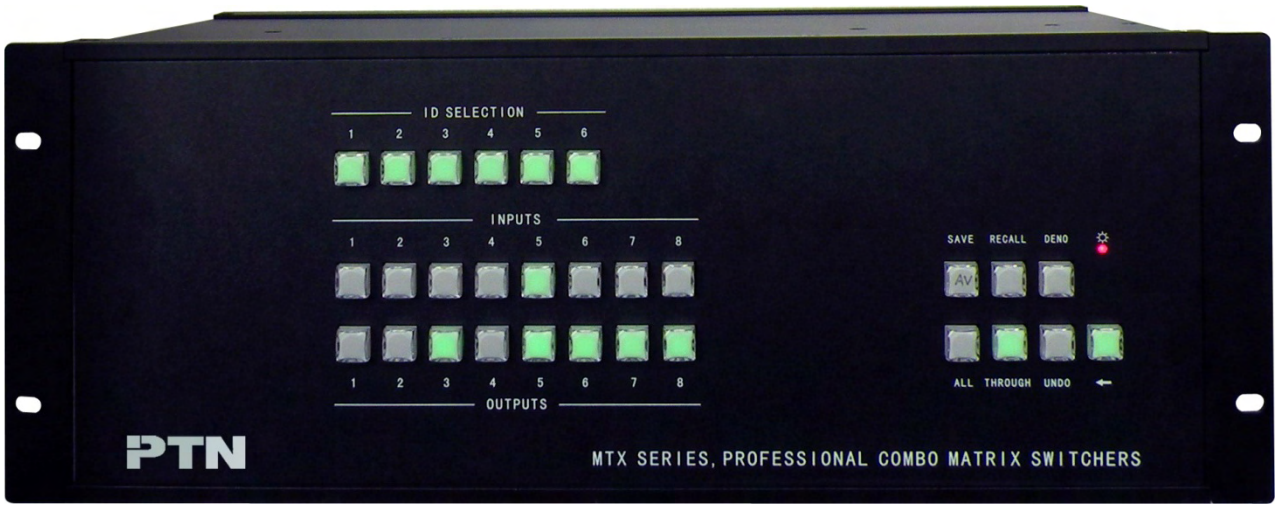
4.1 Front View of the MTX200



4.2 Rear View of the MTX200



4.3 Front View of the MTX400



(Crystal Buttons Version)

There are two different button in the front panel.

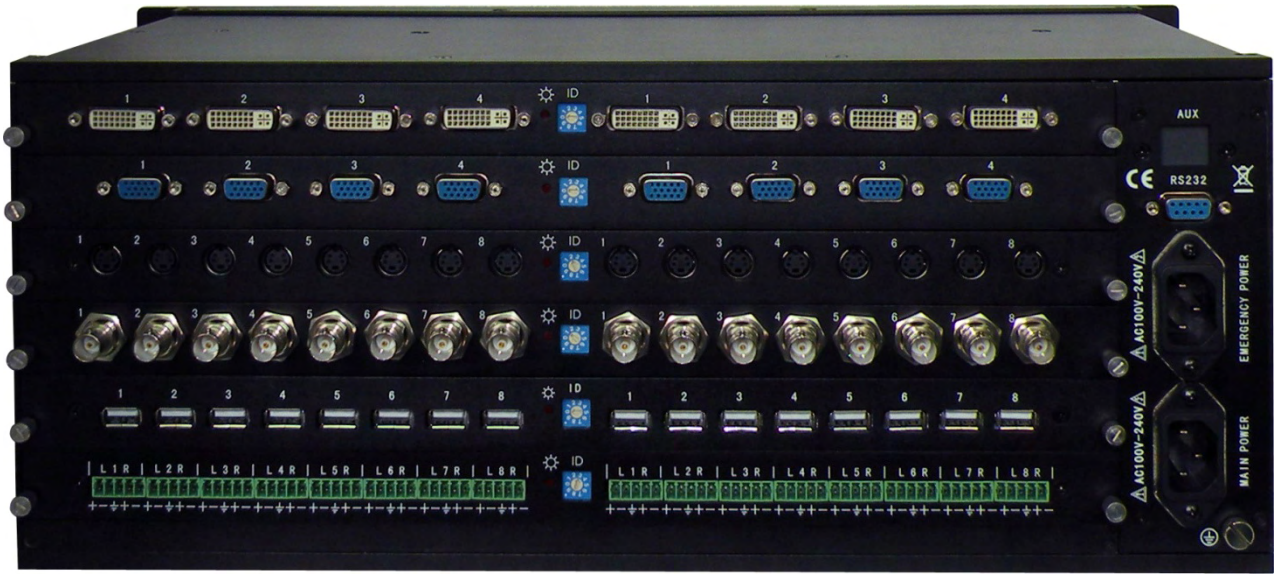
1: Regular buttons.

Black plastic buttons, with red LED indicating.

2: Crystal buttons.

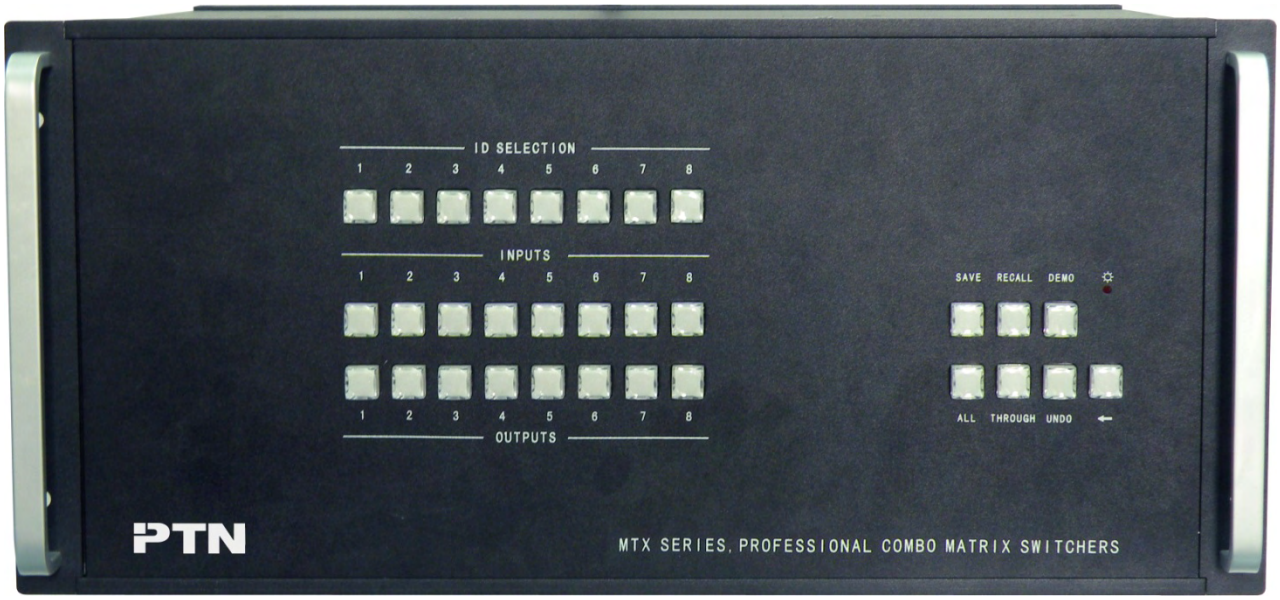
Crystal buttons, with green back-light indicating, which can insert customized label.

4.4 Rear View of the MTX400



（ Maximum installed 6 cards. The cards in the pictures is only for reference. The user can change it , plug and play. ）

4.5 Front View of the MTX500



(Crystal Buttons Version)

There are two different button in the front panel.

1: Regular buttons.

Black plastic buttons, with red LED indicating.

2: Crystal buttons.

Crystal buttons, with green back-light indicating, which can insert customized label.

4.6 Rear View of the MTX500

（ Maximum installed 8 cards. The cards in the pictures is only for reference. The user can change it , plug and play. ）

Please contact us for more information: info@PTN-electronics.com or visit website: www.PTN-electronics.com

5. Changeable Cards Introduction & Installation

5.1 Introduction of the changeable cards and slots

There are various changeable cards, which can insert to the MTX empty slot (hot-swop). It includes different signal, such as DVI, HDMI, VGA, composite video, s-video, USB2.0, stereo audio, audio mixer, twisted pair etc. All these card can be inserted to the MTX main unit (empty slot) by your will. Now, there is the one by one introduction for every card.

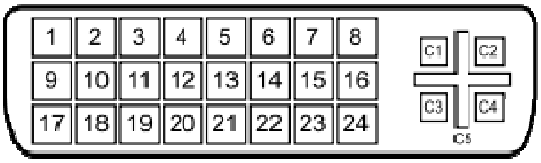
5.1.1 MXDV4

DVI cross point matrix switcher. 4x4. (Please check the specification from 9.2.1)

It is fully compatible with HDMI (HDCP1.3, 1.2, 1.1), not supporting analogy signal.

It is embedded the EDID management technology, supporting CEC, DDC.

Pin Layout of the DVI-I connector (Dual-Link). (female)



PIN	Function	PIN	Function
1	T.M.D.S.Data2-	13	T.M.D.S.Data3+
2	T.M.D.S.Data2+	14	+5V Power
3	T.M.D.S. Data 2/4 Shield	15	Ground (for +5V)
4	T.M.D.S. Data 4-	16	Hot Plug Detect
5	T.M.D.S. Data 4+	17	T.M.D.S. Data 0—
6	DDC Clock	18	T.M.D.S. Data 0+
7	DDC Data	19	T.M.D.S. Data 0/5 Shield
8	No Connect	20	T.M.D.S.Data5—
9	T.M.D.S.Data1-	21	T.M.D.S.Data5＋
10	T.M.D.S.Data1+	22	T.M.D.S. Clock Shield
11	T.M.D.S.Data1/3 Shield	23	T.M.D. S. Clock +
12	T.M.D.S.Data3-	24	T.M.D.S .Clock—

5.1.2 MXDV8

DVI cross point matrix switcher 8x8. (Please check the specification from 9.2.1)

It is fully compatible with HDMI (HDCP1.3, 1.2, 1.1), not supporting analogy signal.

It is embedded the EDID management technology, supporting CEC, DDC.

Please check the 5.1.1 for the introduction of DVI pin layout.

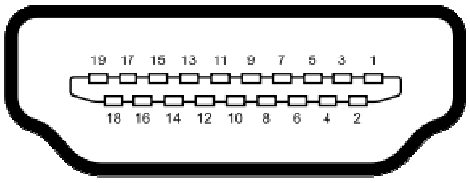
5.1.3 MXHD4

HDMI cross point matrix switcher. 4x4. (Please check the specification from 9.2.1)

It is embedded the EDID management technology, supporting CEC, DDC.

It is also compatible with DVI signal (HDCP required)

Pin layout of the HDMI connectors(female).



Pin Number	Signal Name	Pin Number	Signal Name
1	TMDS Data 2+	**20**	SHELL
2	TMDS Data 2 Shield	**19**	Hot Plug Detect
3	TMDS Data 2-	**18**	+5V Power
4	TMDS Data 1+	**17**	Ground
5	TMDS Data 1 Shield	**16**	DDC Data
6	TMDS Data 1-	**15**	DDC Clock
7	TMDS Data 0+	**14**	No Connect
8	TMDS Data 0 Shield	**13**	CEC
9	TMDS Data 0-	**12**	TMDS Clock-
10	TMDS Clock+	**11**	TMDS Clock Shield

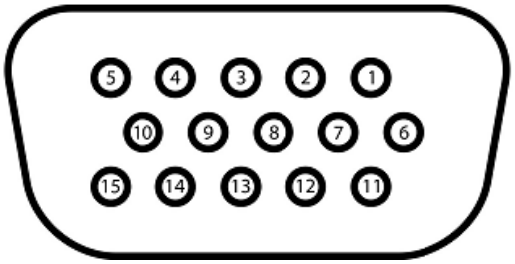
5.1.4 MXVG4

VGA cross point matrix switcher. 4x4. (Please check the specification from 9.2.2)

The bandwidth is up to 350MHz(-3dB)

Supporting RGBHV, RGsB, RGBS, RsGsBs, YUV, YC and Composite video.

Pin layout of the VGA connectors (female):



Pin Number	Signal Name	Pin Number	Signal Name
Pin 1	RED	Pin 9	KEY/PWR
Pin 2	GREEN	Pin 10	GND
Pin 3	BLUE	Pin 11	ID0/RES
Pin 4	ID2/RES	Pin 12	ID1/SDA
Pin 5	GND	Pin 13	HSync
Pin 6	RED_RTN	Pin 14	VSync
Pin 7	GREEN_RTN	Pin 15	ID3/SCL
Pin 8	BLUE_RTN		

5.1.5 MXVG8

VGA cross point matrix switcher 8x8. (Please check the specification from 9.2.2)

The bandwidth is up to 350MHz(-3dB)

Supporting RGBHV, RGsB, RGBS, RsGsBs, YUV, YC and Composite video.

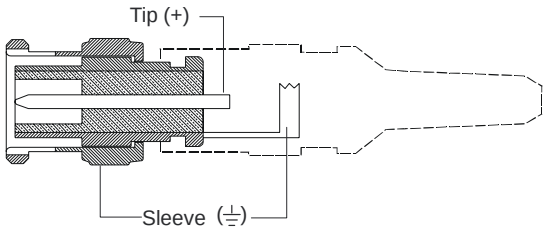
Please check the 5.1.4 for the introduction of VGA pin layout.

5.1.6 MXCV8

Composite Video cross point matrix switcher. 8x8. (Please check the specification from 9.2.2)

The bandwidth is up to 150MHz(-3dB)

The BNC connector is shown as the figure below.



BNC Connector

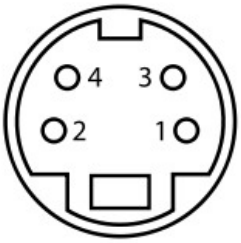
5.1.7 MXSV8

S-Video cross point matrix switcher. 8x8. (Please check the specification from 9.2.2)

The bandwidth is up to 150MHz(-3dB)

Pin lay out of the S-Video connector (female):

Pin Number	Signal Name	Remark
Pin 1	GND	Ground (Y)
Pin 2	GND	Ground
Pin 3	Y	Intensity (Luminance)
Pin 4	C	Color (Chrominance)

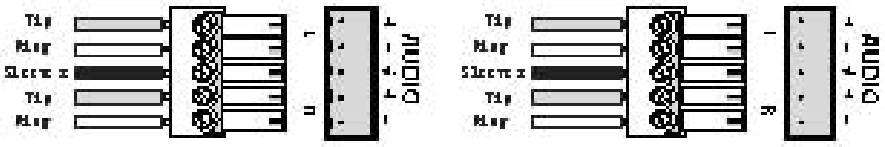


5.1.8 MXAU8

Stereo Audio cross point matrix switcher. 8x8. (Please check the specification from 9.2.3)

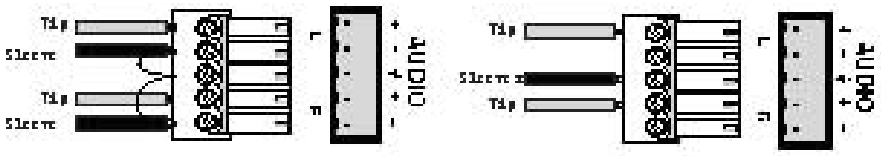
It supports the balanced/unbalanced audio, by different connection.

Balanced Audio Connection:



Balanced Input Balanced Output

Unbalanced Audio Connection:



Unbalanced Input Unbalanced Output

5.1.9 MXUS8

USB2.0 matrix switcher. 8x8. (Please check the specification from 9.2.4)

It does not supports the cross point switching, ONLY one to one switching..

It is working compatible with USB1.0, USB1.1 and PS2.

5.1.10 MXPA8

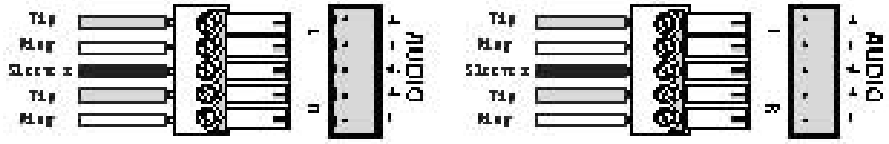
Stereo Audio cross point matrix switcher. 8x8, and embedded the audio processor function. (Please check the specification from 9.2.5, Please check the RS232 code from 7.2)

EQ function: Every input volume is preset-able, every output bass/treble control-able. All these EQ function can be controlled by RS232 or TCP/IP, working with PTN PC software.

Balanced Audio: It supports the balanced/unbalanced audio, by different connection. Please check the connection below:

Audio Mixer : The 8 output is built in the mixer function, which can mix any two or more inputs. The mixer function can be controlled by RS232 or TCP/IP, working with PTN PC software.

Balanced Audio Connection:



Balanced Input　　Balanced Output

Unbalanced Audio Connection:

Unbalanced Input　　Unbalanced Output

5.1.11 MXTP8

Twisted pair cross point matrix switcher. 8x8. (Please check the specification from 9.2.6)
8 inputs (4 VGA/Stereo audio and 4RJ45), 8 outputs (8 RJ45), 1 local monitor for VGA and stereo audio.

It is working with PTN TP200 Pro (VGA/Stereo Audio twisted pair). The transmission distance is up to 300 meters. It is built in the skew equalizer (EQ) function for each channel.

5.2 ID setting during installation

There are several slots in the rear panel of MTX main unit (chassis). The changeable card can be inserted, and working after the ID setting.
Every slot has the defaulted ID, which is fixed after the production. The changeable card has to match the ID of each slot.

The MTX supports the hot-swop, plug and play. When the card is inserted or removed, the RS232 port will send out the feedback codes, for indicating.

5.2.1 Defaulted ID of each slot

The defaulted ID of each slot is counting from “1”, from the top slot to the bottom slot.
We take the MTX400 as an example , The top slot is defaulted as “1”. The second slot is defaulted as “2”, the third slot is defaulted as “3”, and so on and so forth.
Please check the picture :

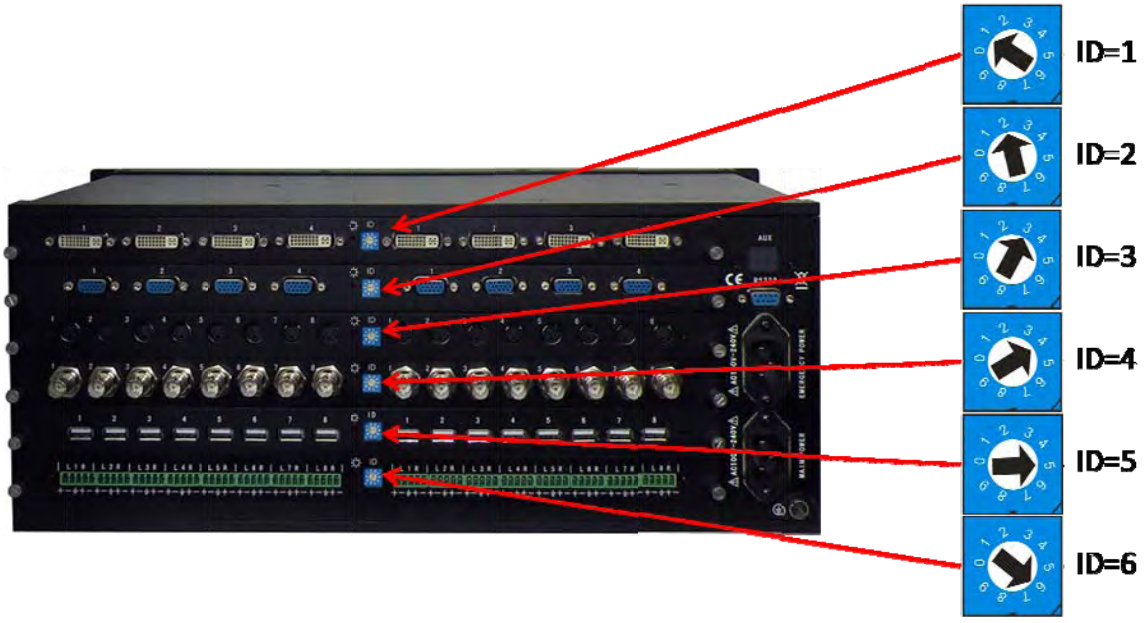
(There are 6 slots to the MTX400. Their ID is ranging from 1 to 6, from top to bottom)

So, it means the ID of MTX200 is ranging from "1" to "3", from top to bottom.
The ID of MTX500 is ranging from "1" to "8", from top to bottom.

5.2.2 ID matching, between the slot and card

The cards will be enable and work , after match the slot ID. It means the user need to manually adjust the card ID, the same as the inserted slot ID.
The MTX main unit will detect the card, after the ID matching. (manually adjust the card ID , to be the same as slot ID.)

Now, we take the MTX400 as an example:



It means the card ID must to be the same as the slot. The RS232 port will send out the feedback code, after the successful matching.
The same ID matching is to MTX200 and MTX500.

5.3 Connection of RS-232 Communication Port

Except the front control panel, the MTX matrix switcher can be control by far-end control system or through the Ethernet control via the RS-232 communication port.

This RS-232 communication port is a female 9-pin D connector. The definition of its pins is as the table below.

Pin No.	Name	Function
1	N/u	Unused
2	Tx	Transmit
3	Rx	Receive
4	N/u	Unused
5	Gnd	Ground
6	N/u	Unused
7	N/u	Unused
8	N/u	Unused
9	N/u	Unused

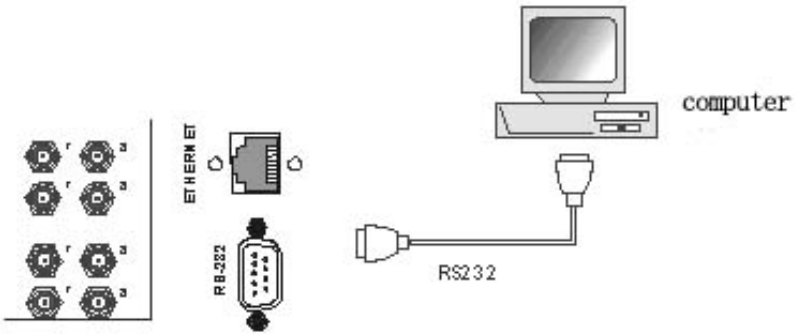
5.3.1 Connection with Control Systems

With the RS-232 port, the MTX matrix switchers can be control by several kinds of control systems.

5.3.2 Connection with Computer

When the switcher connects to the COM1 or COM2 of the computer with control software, users can control it by that computer.

To control the switcher, users may use the RS232 software



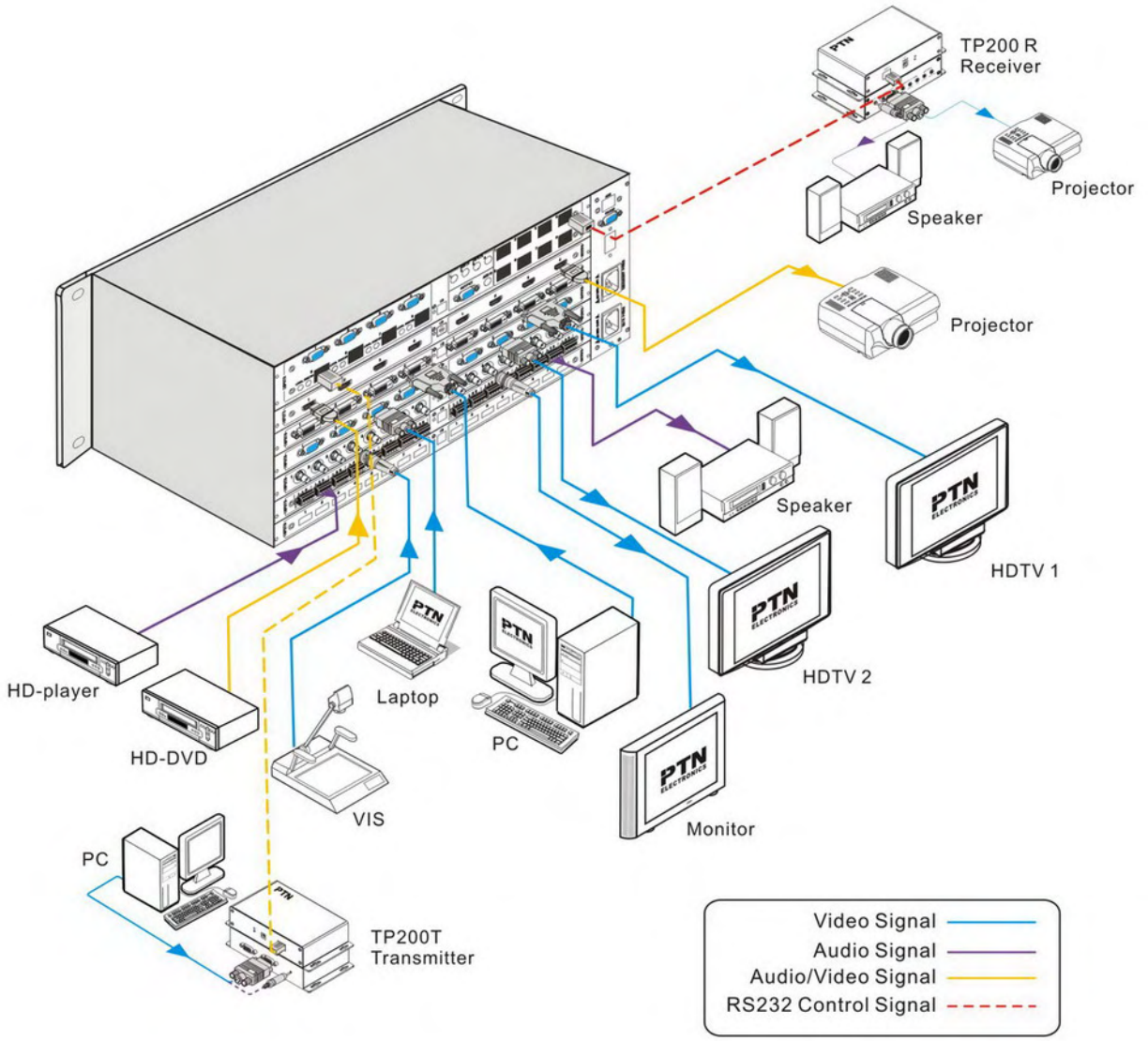
F 5-1 Connection between MTX matrix switcher and the computer

5.4 Connection of TCP/IP Communication Port (Optional Function)

The MTX matrix switchers can work with the PTN model “PTNET”, to enable the TCP/IP function.

The PTNET is a programmable RCP/IP to RS232 processor, which is built in the FTP and fixed IP address inside and working compatible with internet.

5.5 System Diagram



6. Operation of the Control Panel

6.1 Front Panel Description

Buttons	Function Description
ID Selection	ID selection buttons. It is the ID number of every slot. The user need to select the ID, before controlling this slot(card). Example: you want to control the second slot (card), you need to select the ID button "2" in advance.
INPUTS	Input buttons. It is the number of every input channel, ranging from "1" to "8".
OUTPUTS	Output buttons. It is the number of every output channel, ranging from "1" to "8".
SAVE	Saving function of preset. It means you can save the current working status as the preset, in order to recall this function easy in the future. There are 8 presets in total, ranging from 1~8. Example: Press "SAVE" and press "1", the MTX will save the current status as "preset 1"
RECALL	Recall function of preset. It means you can recall the saved preset, and return to some previous working status. Example: Press "RECALL" and press "1", the MTX will recall the working stauts of "preset 1"
DEMO	Demo function. When you press this button, the MTX will enter the demo status, routing automaticlly, from input 1 to output 8, for all the switching testing.
ALL	All button: To transfer an input channel to all output channels or switch off all the output channels Example1: To transfer video and audio signals from input channel No.7 to all output channels Operation: Press buttons in this order “7”, “ALL” Example2: To transfer all input signals to the corresponding output channels respectively. In another word, to switch to this status: 1->1, 2->2, 3->3, 4->4……8->8.
THROUGH	Through button: To transfer the signals directly to the corresponding output channels Example: To transfer the signals from input channel No. 3 to their corresponding output channels Operation: Press buttons in this order “3”, “THROUGH”
UNDO	Undo button: To resume to the status before the command just performed
⇦	Backspace button: To backspace the latest input button

6.2 Command Format of the Switching Operation

With the front control panel, the switcher could be control directly and rapidly by pressing the buttons under below format.

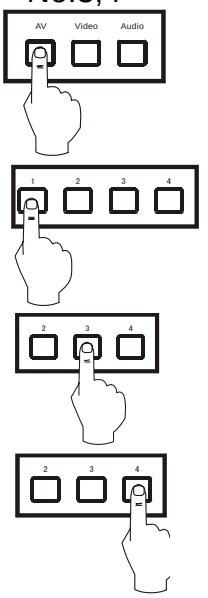
“ID selection” +“Input Channel” +“Output Channels”

“ID selection”: select the right ID, which you are going to control.
“Input Channel”: press the number of input channel to be controlled

"Output Channel": press the number of output channels to be controlled

6.3 Examples of Operation

Example 1: To transfer the signal of ID"1" from input channel No.1 to output channel No.3,4



1, Press the "1" from the ID selection menu.

2, Press the button for input channel number"1"

3,Press the button for the first output channel number "3"

4, Press the button for the second output channel number "4"

Then, switching OK ! the signal of ID"1" is switching from "1" to "3" and "4"

7. Communication Protocol and Command Codes

7.1 RS232 codes of regular switching (not including the MXPA8)

With this command system, the RS232 software is able to control and operate the MTX Matrix with remotely.

Communication protocol:

Baud rate: 9600 Data bit: 8 Stop bit: 1 Parity bit: none

Commands:	Description
/*Type;	Check the system information and ID information.
/%Lock;	Lock the keyboard of the control panel on the matrix.
/%Unlock;	Unlock the keyboard of the control panel on the matrix.
/^Version;	Inquire the version of firmware. **(refer to Detail example 4)**
/:MessageOff;	Switch off the feedback command from the com port. It will only show "switcher OK". **(refer to Detail example 5)**

/:MessageOn;	Switch on the feedback command from the com port. **(refer to Detail example 6)**
Demo.	Switch to the "demo" mode, 1->1, 2->2, 3->3 … and so on, every 2 seconds, and cycled switching.
Save[Z].	Save the present operation to the preset command [Z]. [Z] ranges from 0 to 9. **(refer to Detail example 12)**
Recall[Z].	Recall the preset command [Z]. **(refer to Detail example 13)**
Clear[Z].	Clear the preset command [Z]. **(refer to Detail example 14)**
Undo.	To cancel the previous operation.
&[Y] + Status[x].	Inquire the input channel to the output channel [x1] of [Y] card. **(refer to Detail example 10)**
&[Y] + Status.	Inquire the input channels to the output channels one by one, of [Y] card. **(refer to Detail example 11)**
&[Y] + [x]All.	Transfer signal on [Y] card from input channel [x] to all output channels. **(refer to Detail example 1)**
&[Y] +All#.	Transfer all input signals on [Y] card to the corresponding output channels respectively. **(refer to Detail example 2)**
&[Y] +All$.	Switch off all the output channels on [Y] card. **(refer to Detail example 3)**
&[Y] + [x]#.	Transfer signal on [Y] card from the input channel [x] to the output channel [x]. **(refer to Detail example 7)**
&[Y] + [x]$.	Switch off the output channel [x] on [Y] card. **(refer to Detail example 8)**
&[Y] + [x1] B[x2].	Transfer the signal on [Y] card from the input channel [x1] to the output channel [x2]. **(refer to Detail example 9)**
&[Y] + [x1] B[x2], [x3], [x4].	Transfer the signal on [Y] card from the input channel [x1] to the output channels [x2], [x3] and [x4].

Notice 1 :

[Y] is the floating number, ranging from 0~9. It indentifies the ID of each card.

If [Y]=1, it means you are controlling the first slot.

If [Y]=3, it means you are controlling the third slot.

If [Y]=0, it means you are controlling all the slot at the same time.

If you forget to enter "&[Y]+", the MTX will default it as "0".

Notice 2 :

1. MXDV4 (DVI 4X4) card does not support the "video mute" function.

2. MXUS8 (USB 8X8) doesn't support crosspoint switching. It supports one-to-one switching only. For example, we have signal from input 1 to output 2 now, if we switch to output 4 then output 2 will be cut off automatically.

Detail Examples:

1、 **Transfer signal on [Y] card from one input channel to all output channels:**
&[Y] + [x]All.
Example: To transfer signal on the second card from the input channel No.3 to all output channels.
Run Command: "&2+3All."

2、 Transfer all input signals on [Y] card to the corresponding output channels respectively: &[Y] + All#.

Example: If the command “&1+All#” is carried out, the status of the first card will be: 1->1, 2->2, 3->3, 4->4……8->8.

3、 Switch off all the output channels on [Y] card: &[Y]+ All$.

Example: After running the command “&3+All$”, there will be no signal output on the third card.

4、 Check the version of the firmware: /^Version;

To check the version of the firmware, run command “/^Version”.

5、 Switch off the detail feedback command from the COM port: /:MessageOff;

Switch off the detail feedback information from the COM port. But, it will leave the “switch OK” as the feedback, when you switch the matrix.

6、 Switch on the detail feedback command from the COM port: /:MessageOn;

Switch on the detail feedback information from the COM port. It will show the detail switch information when it switches. Example: when switch 1->2 for Audio, it will feedback “A0102”.

7、 Transfer signal on [Y] card from an input channel to the corresponding output channel: &[Y]+[x]#.

Example: To transfer signal of the fourth card from the input channel No.5 to the output channel No.5. Run Command: “&4+5#.”

8、Switch off an output channel of [Y] card: &[Y]+[x]$.

Example: To switch off the output channel No.5 on the first card. Run Command: “&1+5$.”

9、Switch the signal on [Y] card, from [x1] to [x2]: &[Y]+[x1] B[x2].

Example: To transfer the signal of the fifth card, from the input channel No.8 to the output channel No.3,6,7. Run Command: “&5+8B3,6,7.”

10、Inquire the input channel to the output channel [x] of [Y] card: &[Y]+Status[x].

Example: To inquire the input channel to the output channel No.7 of the first card. Run Command: “&1+Status7.”

11、Inquire the input channels to the output channels one by one, of [Y] card: &[Y]+Status.

Example: To inquire the input channels to the output channels one by one of the first card. Run Command: “&1+Status.”

12、Save the present operation to the preset command [Z]: Save[Z].

Example: To save the present operation to the preset command No.7. Run Command: “Save7.”

13、Recall the preset command [Z]: Recall[Z].

Example: To recall the preset command No.5. Run Command: “Recall5.”

14、Clear the preset command [Z]: Clear[Z].

Example: To clear the preset command No.5. Run Command: “Clear5.”

7.2 RS232 codes of MXPA8

Communication protocol:

Baud rate: 9600 Data bit: 8 Stop bit: 1 Parity bit: none

RS232 commands	Function Desctription

&[Q]+ Audioinit.	Initialize the Volume/Bass/Treble		
&[Q]+ VOICE.	Checking the level of Volume/Bass/Treble of all the channels		
&[Q]+ [Y]API[x] [x].	[xx] is from "00" to "60"	preset the volume of input [Y], 61 degrees	
	[xx] = [UP]	Turning up the volume of input [Y]	
	[xx] = [DO]	Turning down the volume of input [Y]	
&[Q]+ [Z]APO[Y] [x] [x].	[Y] = [H]	[xx] is ranging from "00" to "12"	Preset the treble of output [Z]
		[xx] = [UP]	Turning up the treble of output [Z]
		[xx] = [DO]	Turning down the treble of output [Z]
	[Y] = [L]	[xx] is ranging from "00" to "12"	Preset the bass of output [Z]
		[xx] = [UP]	Turning up the bass of output [Z]
		[xx] = [DO]	Turning down the bass of output [Z]
	[Y] = [A]	[xx] is ranging from "00" to "60"	Preset the volume of output [Z]
		[xx] = [UP]	Turning up the volume of output [Z]
		[xx] = [DO]	Turning down the volume of output [Z]
&[Q]+ [x1]AND[x2],[x3]… [x8].	Input audio mixed. Maximum 8 channels mixed.		

Remark:
&[Q]+ [Q] is the ID of MXPA8） . If you miss sending the "&[Q]+", the code will be sent to all the cards.

8. Specification

8.1 Main Unit (Chassis)

Control parts			
Serial control port	RS-232, 9-pin female D connector	Pin Configurations	2 = TX, 3 = RX, 5 = GND
Intallation	Rack Mountable	Front panel control	Buttons
Options	TCP/IP control by PTNET(PTN's programmable interface)		
General			
Power Supply	110VAC ~ 240VAC, 50/60Hz	Power Consumption	17W (MTX400)
Temperature	-20 ~ +70℃		25W (MTX500)
Case Dimension	W482.6 x H174.5 x D282mm (MTX400)	Product Weight	2.5Kg(MTX400)
	W482.6 x H221.5 x D300mm (MTX500)		3.5Kg (MTX500)

8.2 Changeable Cards

8.2.1 MXDV4, MXDV8, MXHD4

Input		**Output**	
Input	4 DVI; 8 DVI ; 4 HDMI	Output	4 DVI; 8 DVI ; 4 HDMI
Input Connector	Female DB24+5/HDMI	Output Connector	Female DB24+5/HDMI
Input Level	T.M.D.S. 2.9V/3.3V	output Level	T.M.D.S. 2.9V/3.3V
Input Impedence	75Ω	Output Impedence	75Ω
General			
Gain	0 dB	Bandwidth	340 MHz (10.2 Gbit/s)
Video Signal	DVI 1.0 standard DVI-D full digital T.M.D.S signal HDMI 1.3	Max Time-delay	5nS (±1nS)
Switching Speed	200ns (Max.)	Crosstalk	<-50dB@5MHz
Consumer Electronics Control (CEC)	Supports CED wired infrared data pass-through using the HDMI 1.3 standard		
EDID and DDC	Supports Extended Display Identification Data (EDID) and Display Data Channel (DDC) data using DVI and HDMI standards. EDID and DDC signals are actively buffered		
HDCP	Compliant with High-bandwidth Digital Content Protection (HDCP) using DVI and HDMI 1.3 standards		

8.2.2 MXVG4, MXVG8

Input		**Output**	
Input	4 VGA 8 VGA	Output	4 VGA 8 VGA
Input Connector	Female 15 pin HD	Output Connector	Female 15 pin HD
Input Coupling	AC coupling only	Switching Type	Vertical interval
Input Level	0.5 ~ 2.0Vp-p	output Level	0.5 ~ 2.0Vp-p
Input Impedence	75Ω	Output Impedence	75Ω
General			
Gain	0 dB	Bandwidth	350MHz (-3dB), fully load
Video Signal	VGA-UXGA,RGBHV,RGBS, RGsB, RsGsBs, component video, S-video, and composite video .	Video Type	VGA-UXGA,RGBHV,RGBS, RGsB, RsGsBs, component video, S-video, and composite video .
Switching Speed	200ns (Max.)	Crosstalk	<-50dB@5MHz

8.2.3 MXCV8, MXSV8

Input		Output	
Input	8 video	Output	8 video
Input Connector	Female RCA/S-V	Output Connector	Female RCA/ S-V
Input Coupling	AC coupling only	Switching Type	Vertical interval
Input Level	0.5 ~ 2.0Vp-p	output Level	0.5 ~ 2.0Vp-p
Input Impedence	75Ω	Output Impedence	75Ω
General			
Gain	0 dB	Bandwidth	150MHz (-3dB), fully load
Video Signal	c-video/s-video	Video Type	NTSC3.58, NTSC4.43, PAL,SECAM
Switching Speed	200ns (Max.)	Crosstalk	<-50dB@5MHz

8.2.4 MXAU8

Input		Output	
Input	8 stereo	Output	8 stereo
Input Connector	3.5 mm captive screw connec 5 pole	Output Connector	3.5 mm captive screw connectors, 5 pole
Input Impedance	>10KΩ	Output Impedance	50Ω
General			
Frequency Response	20Hz~20KHz, ±0.5dB	CMRR	>90dB@20Hz~20KHz
Stereo Channel Separation	>80dB@1KHz	THD + Noise	1% @ 1 kHz, 0.3% @ 20 kHz at nominal level
Audio Bits per Sample	18 bits per channel, 2 channels (L, R)		

8.2.5 MXPA8

Input		Output	
Input	8 stereo	Output	8 stereo
Input Connector	3.5 mm captive screw connectors, pole	Output Connector	3.5 mm captive screw connectors, 5 pole
Input Impedance	>10KΩ	Output Impedance	50Ω
General			
Mixer Processor	Built in DSP effects	Mixer Max. Output Gain	21 dB
Input Volume	61 degrees controllable/preset	Output Volume	61 degrees controllable/preset 13 degrees Bass/Treble controllable/preset
Frequency Response	20Hz~20KHz, ±0.5dB	CMRR	>90dB@20Hz~20KHz

Stereo Channel Separation	>80dB@1KHz	THD + Noise	1% @ 1 kHz, 0.3% @ 20 kHz at nominal level
Audio Bits per Sample	18 bits per channel, 2 channels (L, R)		

8.2.6 MXUS8

Input		**Output**	
Input	8 USB2.0	Output	8 USB2.0
Input Connector	USB-A female connector	Output Connector	USB-A female connector
General			
Gain	0 dB	Bandwidth	480Mbps, bidirectional communication. Supporting Hot Swap
Signal Type	USB2.0 (Universal Serial Bus)	Switching Speed	200ns (Max.)

8.2.7 MXTP8

Video Input		**Video Output**	
Input	4 VGA, 4 RJ45	Output	1 VGA, 8 RJ45
Input Connector	Female 15 pin HD ,female RJ45	Output Connector	Female 15 pin HD, female RJ45
Input Level	0.5 ~ 2.0Vp-p	output Level	0.5 ~ 2.0Vp-p
Input Impedence	75Ω	Output Impedence	75Ω
Horizontal Frequency	15 Khz to 130Khz	Switching Type	Vertical interval
Vertical Frequency	30Hz to 150 Hz	Return Loss	<-30dB@ 5MHz
Video General			
Gain	0 dB	Bandwidth	450MHz (-3dB), fully load
Video Signal	Composite video, YC, YUV, RGsB, RGBS, RsBsGs, RGBHV	Switching Speed	200ms (Max.)
Crosstalk	-55dB@ 10MHz,-45dB@ 30MHz,-37dB@ 100MHz		
Audio Input		**Audio Output**	
Input	4 stereo,unbalanced	Output	1 stereo,unbalanced
Input Connector	3.5mm mini jack for audio	Output Connector	3.5mm mini jack for audio
Input Impedance	>10KΩ	Output Impedance	50Ω
Audio general			
Frequency Response	20Hz ~ 20KHz ± 1dB	CMRR	>90dB@20Hz~20KHz
Stereo Channel Separation	>80dB@1KHz	THD + Noise	0.15% @ 1 kHz at nominal level
S/N	>70 dB at maximum output(unweighted)		

9. Troubleshooting & Maintenance

1) When the output image in the destination device connected to the MTX Matrix has ghost, such as the projector output with ghost, please check the projector's setting or try another high quality connection cord.

2) When there is a color losing or no video signal output, it may be the unmatched RGBHV connector order between the input and output end.

3) When the remote controller doesn't works:
   A. Maybe the battery is run out of, please change a new one.
   B. Maybe the controller is broken, please ask the dealer to fix it.

4) When user can not control the MTX Matrix by computer through its COM port, please check the COM port number in the software and make sure the COM port is in good condition.

5) When switching , the beeper beeps but without any output image：
   A. Check with oscilloscope or multimeter if there is any signal at the input end. If there is no signal input, it may be the input connection cord broken or the connectors loosen.
   B. Check with oscilloscope or multimeter if there is any signal at the output end. If there is no signal output, it may be the output connection cord broken or the connectors loosen.
   C. Please make sure the destination device is exactly on the controlled output channel
   D. If it is still the same after the above checking, it may be something wrong in the switcher. Please send it to the dealer for fixing.

6) If the output image is interfered, please make sure the system is earthed well.

7) If the static becomes stronger when connecting the BNC connectors, it may be due to the incorrect earthing of the power supply, Please earth it again correctly, and otherwise it would bring damage to the switcher or shorten its natural life.

8) If the Matrix can not be controlled by the keys on the front panel, RS232 port or remote controller, the host may has already been broken. Please send it to the dealer for fixing.